ISTEP+ Science Item Sampler
Updated February 2011

Purpose

The purpose of this Item Sampler is to provide teachers and students with examples of the different types of questions that will appear on the ISTEP+ Science assessment. The types of questions include: multiple choice, constructed response, and extended response. Teachers are encouraged to use this information as a resource to help create other assessments and activities.

Constructed Response (CR) and Extended Response (ER) Items

The Applied Skills Assessment contains constructed response and extended response items. These items will require a higher level of thinking, and the extended response items may be slightly more complex. Extended response items, in general, will also take students longer to respond. Both constructed response and extended response items may require students to provide an explanation or justification within the item.

The Content Standards that will be assessed on the Applied Skills Assessment are indicated below.

Grade 4: Grades 3 and 4 Standards 1, 2, 5 and Grades 3 and 4 process skills
Grade 6: Grades 5 and 6 Standards 2, 3, 4, 5 and Grades 5 and 6 process skills

ALL STANDARDS will be assessed on the Multiple Choice Assessment in April/May!

Scoring Rubrics

The Scoring Rubrics used for the CR and ER items were developed in such a way as to score items more holistically and to report students' scores more accurately. In contrast, previous ISTEP+ rubrics were more analytic in nature and did not always allow for the scoring of student responses in a holistic manner. For each CR and ER item, students will receive a score for the content being assessed.

Grade 4 Sample Items

1. Which event is caused by Earth rotating on its axis?

   A. four different seasons
   B. the changing of the phases of the moon
   C. one day and one night in every 24 hours
   D. 365 days in a year

2. A soil sample contains living and nonliving materials. Which material was once living?

   A. sand particles
   B. decomposing leaves
   C. small pebbles
   D. water droplets

3. In order to survive, all animals need

   A. roots, leaves, and stems
   B. eyes, nose, and ears
   C. light, soil, and nutrients
   D. food, water, and air

4. When the Rocky Mountains first formed, they were twice as tall as they are today. Name THREE NATURAL causes that could have eroded the Rocky Mountains over time.

   _____

   _____

   _____

5. Gerardo performed a science experiment in which he did the following:

   - He planted the same kind of seeds in pots A and B.
   - He planted 5 seeds in pot A and 5 seeds in pot B.
   - The amount and type of soil in both pots was the same.
   - He added the same amount of water to both pots each week.
   - Pot A was placed next to a sunny window.
   - Pot B was placed in a dark room.

After 4 weeks, Gerardo observed the plants in both pots. The plants in pot A were green, with tall, thick stems. The plants in pot B were yellow, with tall, thin stems.

Give the MOST LIKELY explanation of why the plants in pot A were different from the plants in pot B.

_____

_____

_____

6. Lee predicted that warm water would boil faster than water at room temperature. He performed an experiment to find out whether warm water (at 40° Celsius) boiled faster than water at room temperature (at 20° Celsius). He recorded his results in the table below.

Trial	Starting Temperature (°C)	Amount of Water (L)	Time It Took To Boil (min.)
A	20	2	9
B	20	2	10
C	20	2	9
D	20	2	9 ½
E	40	2	6
F	40	2	5
G	40	2	15
H	40	2	5 ½

Name TWO tools Lee used to complete his experiment.

_____

_____

Does the data shown in the table above support Lee's prediction? Explain why or why not.

_____

_____

_____

Lee's teacher says that Lee should communicate his results to other scientists. Give one reason that it is important for scientists to communicate their results to one another.

_____

_____

Look at the amount of time that it took the warm water in Trial G to boil. What is ONE possible explanation for this trial having such a different outcome from the other three warm water trials?

_____

_____

7. Emma investigated which brand of food her hamster likes best. She put equal amounts of each brand of food into three different food dishes and placed all three dishes in the hamster cage on a Monday morning. On the following Friday afternoon, Emma recorded how much of each brand of food was left in the bowls. Her results are shown in the table below.

Hamster Food Choices

Brand of Hamster Food	Amount of Food Given (grams)	Amount of Food Left (grams)	Amount of Food Eaten (grams)
A	50	40	10
B	50	0	50
C	50	30	20

Name ONE tool Emma used to complete her investigation.

_____

How much more of the Brand C food did Emma's hamster eat than the Brand A food?

_____

Which brand of food does Emma's hamster like best?

_____

Describe the information you used to determine which brand of food Emma's hamster likes best.

_____

_____

Emma is going to do another investigation to find out what color of water her hamster prefers. What unit of measurement should she use when she measures out the water?

_____

Grade 6 Sample Items

1. Jenna rolled a small glass marble and a large glass marble down a ramp at the same time to see if the large marble would roll further than the small one. She repeated this investigation four times. The table below shows her results.

Distances Rolled by Marbles of Different Sizes

Trial	Small Marble (centimeters)	Large Marble (centimeters)
1	305	300
2	306	304
3	299	309
4	301	298

Which statement CORRECTLY describes information found in Jenna's table?

A. The small marble rolled further than the large marble in trials 2 and 3.
B. The large marble rolled further than the small marble in trials 1 and 4.
C. The difference in distances rolled by the small marble is less than 8 centimeters.
D. The difference in distances rolled by the large marble is less than 8 centimeters.

2. Snakes feed on mice. The mice eat grain crops. When the crops are plentiful, what will happen?

A. The mouse population will decrease.
B. The snake population will increase.
C. The snake population will decrease.
D. The mouse population will not change.

3. Describe the steps required for water in a lake to fall as rain onto an area of land. Be sure to include the changes that happen to the water in each step.

_____

_____

_____

_____

_____

4. Ben was playing with his remote-controlled toy truck on the sidewalk in front of his home. He placed the control on low speed and let the truck travel 300 centimeters. He calculated that the speed of the truck was 54 centimeters per second.

   Ben then put 50 grams of soil into the bed of the truck. He placed the control on low speed and let the truck travel the same 300 centimeters. Describe how the speed of the truck would be affected by adding the soil. Explain your answer.

   _____

   _____

   _____

   _____

   With the same toy truck loaded with 50 grams of soil, Ben placed the control on high speed and let the truck travel the same 300 centimeters. Describe how the speed of the loaded toy truck at high speed would compare to the speed of the loaded toy truck at low speed. Explain your answer.

   _____

   _____

   _____

   _____

5. Mark is studying how long different animals usually live. He found information on four different animals. His data are listed below.

   *Black panthers live about 12 years in the wild and about 20 years in a zoo.
   *Giraffes live about 20 years in the wild and about 25 years in a zoo
   *Gorillas live about 35 years in the wild and about 50 years in a zoo.
   *River otters live about 8 years in the wild and about 21 years in a zoo.

   Use the information Mark gathered to complete the DATA TABLE below.

How Long Animals Live

	Living in the Wild (years)	

According to the table, which animals live more than 15 years in the WILD?

_____

_____

According to the table, which animal lives almost THREE times as long in a zoo as it does in the wild?

_____

_____

Give ONE reason why all the animals Mark studied tend to live longer in a zoo than they do in the wild.

_____

_____

6. Laura wondered about how the amount of time a battery is charged affects the time a flashlight gives off light. She did the following investigation.

Question:
How does the amount of time a battery is charged affect the time the flashlight gives off light?

Prediction:
A flashlight should give off light for about the same amount of time as the batteries were charged because the energy put into the battery should be about the same as the energy out.

Materials:
uncharged batteries
battery charger
flashlight
timer

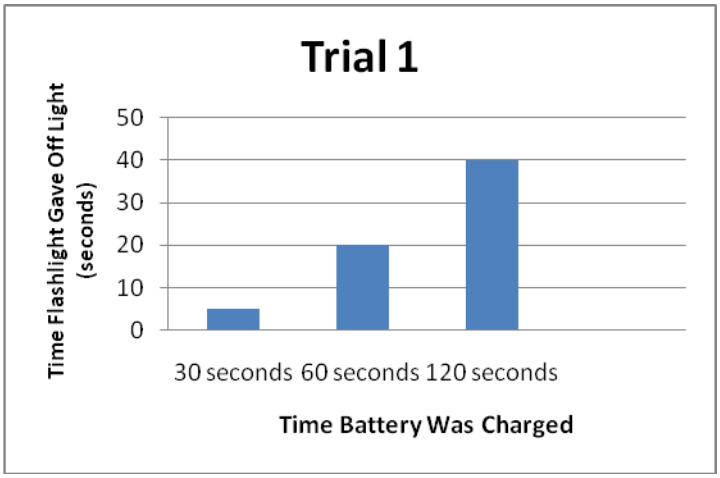
Procedure:

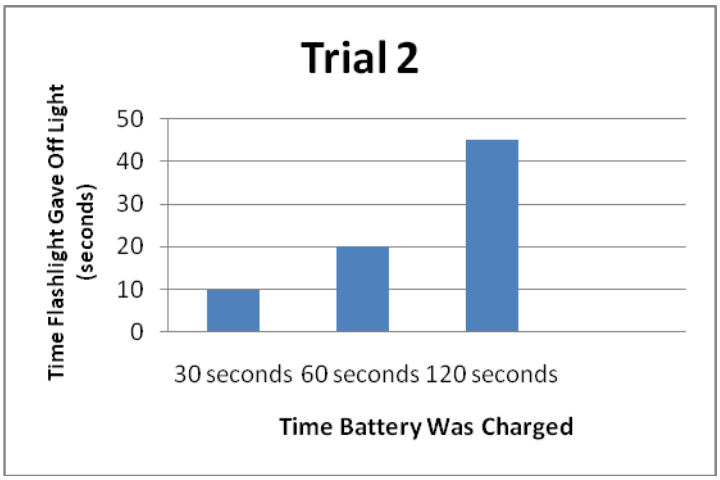
a. Place 2 uncharged batteries in the charger. Turn on the charger for 30 seconds.
b. Put the 2 charged batteries into the flashlight.
c. Turn the flashlight on. Measure and record in the table the time the flashlight is giving off light as trial 1 for the amount of time the batteries were charged.
d. Repeat steps 1-3 increasing the charging time from 30 seconds to 60 seconds, and to 120 seconds. Record the data in the table for each test.
e. Repeat the entire investigation two more times as Trials 2 and 3.

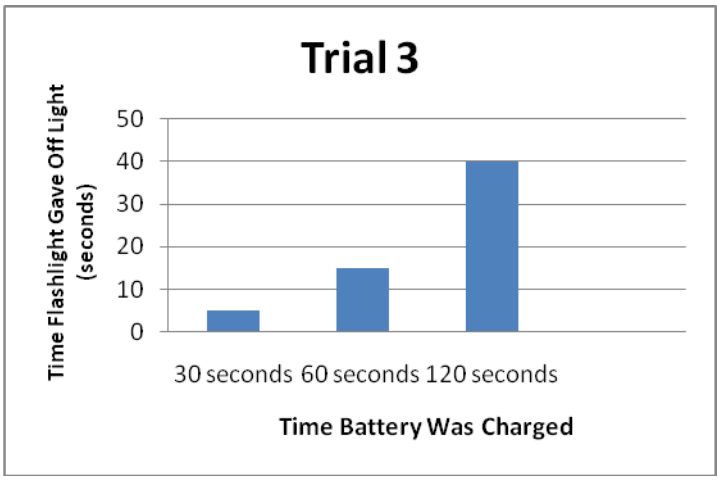
Laura put her results in the data table below and created 3 bar graphs to display the data for each trial. Using the bar graphs, fill in the missing information in the data table below.

Time Battery Was Charged vs. Time Flashlight Gave Off Light

Time Battery was Charged (seconds)	**Time Flashlight Gave Off Light (seconds)**		
	Trial 1	**Trial 2**	**Trial 3**
30			
120			


Trial 1
Time Flashlight Gave Off Light (seconds)
50
40
30
20
10
0
30 seconds
60 seconds
120 seconds
Time Battery Was Charged


Trial 2
Time Flashlight Gave Off Light (seconds)
50
40
30
20
10
0
30 seconds
60 seconds
120 seconds
Time Battery Was Charged


Trial 3
Time Flashlight Gave Off Light (seconds)
50
40
30
20
10
0
30 seconds
60 seconds
120 seconds
Time Battery Was Charged

Why did Laura put her results in a table and graphs?

_____

_____

_____

Do the results shown in the table and graphs support Laura's prediction? Explain why or why not.

_____

_____

_____

_____

Grade 4 Answer Key

Item Number	Answer	Standard
1	C	3 – The Physical Setting
2	B	3 – The Physical Setting
3	D	4 – The Living Environment

4. Constructed Response Item (The Physical Setting)

Key element(s): (Any three of the following.)
Natural causes that could have eroded the Rocky Mountains over time.

- Water
- Wind
- Ice
- Effects of plate (tectonic) movement
- Gravity (mass movement)
- Other reasonable response

5. Constructed Response Item (The Nature of Science and Technology)

- Pot A received more sunlight than pot B.

6. **Extended Response Item (The Nature of Science and Technology)**

- Any two of the following: thermometer; beaker; flask; graduated cylinder; stopwatch; timer; other valid response
- Trials A-F and Trial H support Lee's prediction; Trial G does not support Lee's prediction; any other valid response
- Any of the following: it enables scientists to be informed about one another's work; to expose their ideas to evaluation by other scientists; to allow scientists to stay informed about scientific discoveries around the world
- Any of the following: the starting temperature was lower than 40 degrees Celsius; more than 2 liters of water were used; the timer or stopwatch was read incorrectly; the stove or burner was not working properly

7. Extended Response Item (Scientific Thinking)

- balance/scale
- 10 grams

- Brand B
- Any valid response indicating that the hamster ate more of Brand B than the other two brands of food
- milliliters or liters

Grade 6 Answer Key

Item Number	Answer	Standard
1	C	2 – Scientific Thinking
2	B	4 – The Living Environment

3. Constructed Response Item (The Physical Setting)

- Water in the lake changes from liquid to gas in the air (when warmed by the sun).
- The water in the air changes back into liquid water and forms clouds (because the water is cooled as it moves higher into the atmosphere).
- Water droplets in the clouds fall onto the land as rain.

4. Constructed Response Item (The Physical Setting)

- Any valid response indicating that Ben's truck would go more slowly than it did before/slower than 54 cm/s; or indicating that the truck would have more mass in it and will have the same amount of power it did the first time.
- Any valid response indicating that the loaded truck will go faster on high speed than on low speed; or indicating that placing the control on high speed would give the truck more power than placing the control on low speed.

5. Extended Response Item (Scientific Thinking)

- Data table correctly describes, organizes, and displays all information: (two key elements)
    - all columns/rows labeled appropriately, including units of measurement table organized/labeled so that data relationships can be determined
    - all data entered correctly

  Exemplary response:

Animal	Living in the Wild (years)	Living in Zoo (years)
Black panther	12	20
Giraffe	20	25
Gorilla	35	50
River Otter	8	21

- giraffes and gorillas
- river otters

- Any of the following:
    - They are always given enough food to eat (and water to drink) in the zoo.
    - They do not always get enough food to eat (and water to drink) in the wild.
    - They are protected from predators in the zoo.
    - They are not protected from predators in the wild.
    - They are kept in clean, temperature-controlled areas in the zoo.
    - They cannot always live in safe and healthy areas in the wild (and in the wild they must survive any strange weather that comes to their area).
    - Any other valid reason why the animals live longer in the zoo than in the wild

6. Extended Response Item (Scientific Thinking)

- All data correctly entered into the data table.

Time Battery Was Charged vs. Time Flashlight Gave Off Light

Time Battery was Charged (seconds)	Time Flashlight Gave Off Light (seconds)		
	Trial 1	Trial 2	Trial 3
30	5	10	5
60	20	20	15
120	40	45	40

- Any valid response explaining that recording data in a table helps to organize the results and makes it easier and more clear to read the results; **OR** displaying data in a graph helps to identify the relationships they reveal; **OR** both tables and graphs help scientists analyze data more easily.
- Any valid response identifying that the results do not support Laura's prediction that a flashlight would give off light about the same amount of time the batteries were charged.
    - The flashlight with the batteries charged for 30 seconds only gave off light for 5 and 10 seconds; the flashlight with the batteries charged for 60 seconds only gave off light for 15 and 20 seconds, and the flashlight with the batteries charged for 120 seconds only gave off light for 40 and 45 seconds. **OR**
    - If the prediction were true then the times that the flashlight gave off light would be much closer to the times that the batteries were charged, and the numbers were far from that.